WHAT IS CLAIMED IS:

1. A method for obtaining a plurality of quantities of compositions with an apparatus comprising a plurality of collectors, the method comprising:

reacting a first quantity of fluid reactants to form a first quantity of product composition;

collecting the first quantity of product composition using a first collector;

following completion of the collection of the first quantity of product composition, reacting a second quantity of fluid reactants to form a second quantity of product composition, the second quantity of product composition being materially different from the first quantity of product composition; and

collecting the second quantity of product composition using a second collector.

2. The method of claim 1 wherein the composition of the second quantity of fluid reactants is different from the composition of the first quantity of fluid reactants.

3. The method of claim 1 wherein a reaction condition during the reaction of the second quantity of fluid reactants is different from the reaction condition during the reaction of the first quantity of fluid reactants.

4. The method of claim 3 wherein the reaction condition is selected from the group consisting of pressure, reactant flux, reactant temperature, amount of inert diluent, amount of radiation absorbing gas, and energy input.

5. The method of claim 1 wherein the apparatus comprises a nozzle that moves relative to the plurality of collectors and wherein the nozzle is moved relative to the first collector and second collector following completion of the collection of the first quantity of product composition.

6. The method of claim 5 wherein the nozzle remains fixed and the collectors are moved relative to the nozzle.

7. The method of claim 5 wherein the collectors remain fixed and the nozzle is moved relative to the collectors.

8. The method of claim 1 wherein the apparatus has a radiation path defined by a radiation source and directing optical elements and wherein the reacting of the fluid reactants involves interacting radiation from the radiation source with the reactants.

9. The method of claim 8 wherein the radiation source is an infrared laser.

10. The method of claim 1 wherein the reactions are performed in a reaction chamber sealed from the ambient environment.

11. The method of claim 10 wherein the compositions comprise particles and the apparatus further comprises a pump and valves, and wherein the valves are opened and closed such that the first collector is exposed to the forces of the pump while the first quantity of particles are being collected and the second collector is exposed to the forces of the pump while the second quantity of particles are being collected.

12. The method of claim 1 further comprising evaluating the properties of the first quantity of

product composition and the second quantity of product composition.

13. The method of claim 1 wherein one of the quantity of reactants is introduced into a reaction zone through a plurality of inlets oriented such that the reactants combine after they pass through the inlets, the reaction of the one quantity of reactants taking place within the reaction zone.

14. The method of claim 1 further comprising delivering the first quantity of reactants through a first nozzle and delivering the second quantity of reactants through a second nozzle.

15. An apparatus comprising:

a nozzle connected to a reactant source; and

a plurality of collectors, wherein the nozzle and the plurality of collectors move relative to each other such that a collector can be selectively placed to receive a fluid stream emanating from the nozzle, each collector comprising a gas permeable membrane.

16. The apparatus of claim 15 further comprising a reaction chamber wherein the reaction chamber is closed from the ambient environment.

17. The apparatus of claim 16 wherein the plurality of collectors are connected to a pump.

18. The apparatus of claim 15 wherein the nozzle is fixed in position and the plurality of collectors move relative to the nozzle.

19. The apparatus of claim 15 wherein the plurality of collectors are fixed in position and the nozzle moves relative to the collectors.

20. The apparatus of claim 15 further comprising directing optical elements that define a radiation path

through the reaction chamber that intersects a fluid stream from the nozzle.

21. The apparatus of claim 20 further comprising a laser and optics that direct a laser beam along the radiation path.

22. The apparatus of claim 21 wherein the laser is a CO_2 laser.

23. The apparatus of claim 15 further comprising a shielding gas inlet connected to an inert gas source wherein the shielding gas inlet is oriented to direct a stream of shielding gas to confine the fluid reactant stream.

24. The apparatus of claim 15 wherein the nozzle comprises an elongated reactant inlet having an opening with a length along its major axis being at least twice its width along its minor axis.

25. The apparatus of claim 15 wherein the nozzle comprises a plurality of inlets oriented such that reactants from the inlets are combined within the reaction chamber.

26. The apparatus of claim 15 wherein the nozzle is mounted on a slide, the plurality of collectors are positioned in a linear configuration parallel to the length of the slide and the nozzle is connected to a motor such that movement of the motor positions the nozzle along the slide.

27. The apparatus of claim 15 wherein the plurality of collectors comprises an array of separate collectors.

28. The apparatus of claim 27 wherein the array is a one dimensional array.

29. The apparatus of claim 27 wherein the array is a two dimensional array.

30. The apparatus of claim 15 wherein the plurality of collectors comprises a sheet of filter material and each collector comprises a separate portion of the filter material.

31. The apparatus of claim 15 further comprising a second nozzle movable relative to a plurality of collectors.

32. An apparatus comprising:

a nozzle connected to a reactant source;

a plurality of collectors, wherein the nozzle and the plurality of collectors move relative to each other such that a collector can be selectively placed to receive a fluid stream emanating from the nozzle; and

a product composition within the fluid stream.

33. The apparatus of claim 32 wherein the product composition comprises particles.

34. The apparatus of claim 32 further comprising a second nozzle connected to a reactant source and a second plurality of collectors, wherein the second nozzle and the second plurality of collectors move relative to each other such that a collector can be selectively placed to receive a fluid stream emanating from the second nozzle.

34. A method for the rapid evaluation of the properties of particles, the method comprising:

collecting a plurality of quantities of particles wherein each quantity of particles is collected using a separate particle collector comprising a gas permeable membrane; and

evaluating a property of each quantity of particles with the particles in contact with the gas permeable membrane.

35. The method of claim 34 wherein the particle collectors are positioned at the same location at which the particles were collected when evaluating the properties of the particles.

36. The method of claim 34 wherein the particle collectors are removed from their position for particle collecting when the properties of the particles are evaluated.

37. The method of claim 34 further comprising producing each quantity of particles within a fluid stream in a reaction chamber.

38. A method for producing a mixture of compositions, the method comprising:

reacting a first quantity of fluid reactants form a first quantity of product composition;

collecting the first quantity of product composition using a collector;

following completion of the collection of the first quantity of product composition, reacting a second quantity of fluid reactants to form a second quantity of product composition, the second quantity of product composition being materially different from the first quantity of product composition; and

collecting the second quantity of product composition using the collector.